

Having thus described the preferred embodiments, the invention is now claimed to be:

1. A sport ball having an integral pump, said ball comprising:
 - a flexible ball body adapted to retain pressurized air, said body defining an aperture;
 - a pump disposed in said aperture and retained within said ball body; said pump including (i) a cylinder, (ii) a piston disposed in said cylinder, said piston movable between an extended position and an inserted position, and (iii) a valve assembly configured to introduce air into said ball body upon movement of said piston from said extended position to said inserted position, and to also introduce air into said ball body upon movement of said piston from said inserted position to said extended position.
2. The sport ball of claim 1 wherein said sport ball is a basketball.
3. The sport ball of claim 1 wherein said sport ball is a football.
4. The sport ball of claim 1, said ball further comprises a second integral pump.
5. An inflatable ball having an integral dual action pump assembly for changing air pressure within said ball, said ball comprising:
 - a rubber bladder defining an interior region adapted for retaining pressurized air;
 - an outer layer disposed about said rubber bladder; and
 - a pump assembly disposed in said interior region of said rubber bladder, said pump assembly including a movable plunger sealingly disposed within a cylinder secured to said rubber bladder, said plunger movable in both a forward stroke and a reverse stroke, said pump assembly adapted to transfer air to said interior region of said rubber bladder by moving said plunger in either said forward stroke or said reverse stroke.

6. The ball of claim 5 wherein said plunger has a cap end accessible from said outer layer of said ball, a sealing end disposed within said cylinder, and a tubular wall extending between said cap end and said sealing end.

7. The ball of claim 5 wherein said cylinder has a head end secured to said rubber bladder, a nozzle end disposed in said interior region of said rubber bladder, and a cylindrical sidewall extending between said head end and said nozzle end, said cylinder defining an interior hollow chamber accessible from said head end and extending between an interior circumferential surface of said cylindrical sidewall and an interior end wall disposed adjacent said nozzle end and directed toward said head end.

8. The ball of claim 7 further including an air transfer tube disposed within said interior hollow chamber of said cylinder and extending from said interior end wall towards said head end.

9. The ball of claim 8 wherein said plunger defines an interior hollow region accessible from said sealing end of said plunger, said plunger being positioned and disposed within said hollow chamber of said cylinder such that said air transfer tube is disposed in said interior hollow region of said plunger.

10. The ball of claim 5 wherein said ball is selected from the group consisting of a basketball, a football, a soccer ball, and a volleyball.

11. The ball of claim 10 wherein said ball is a basketball.

12. The ball of claim 10 wherein said ball is a football.

13. The ball of claim 5 wherein said ball further comprises a counterweight positioned on said ball and of a suitable mass such that the center of mass of said ball coincides with the geometric center of said ball.

14. The ball of claim 5 further comprising:
a secondary inflation valve.

15. The sport ball of claim 5, said ball further comprising a second integral pump.

16. An inflatable sport ball having an integral dual action pump assembly for changing air pressure within said ball, said ball comprising:

a ball carcass defining an interior region for retaining air at a pressure greater than atmospheric pressure, said carcass defining an aperture between said interior region and the exterior of said ball;

a pump assembly disposed within said aperture and extending into said interior region, said pump assembly comprising: (i) a pump cylinder including an open end, a nozzle end, and a cylindrical sidewall extending between said open end and said nozzle end, said cylinder defining a generally hollow interior; and (ii) a pump plunger having a cap end, a sealing end, and a tubular wall extending between said cap end and said sealing end, said plunger defining a generally hollow interior accessible from said sealing end, said plunger movably disposed within said hollow interior of said cylinder between a forward position at which said sealing end of said plunger is proximate said nozzle end of said cylinder and a reverse position at which said sealing end of said plunger is proximate said open end of said cylinder; wherein air is transferred to said interior region of said ball carcass upon movement of said plunger (i) from said forward position to said reverse position, or (ii) from said reverse position to said forward position.

17. The sport ball of claim 16 wherein said generally hollow interior of said pump cylinder is defined by an interior end wall proximate said nozzle end and an interior circumferential surface defined by said cylindrical sidewall, said pump cylinder further including an air transfer tube extending within said hollow interior of said pump cylinder and providing communication between said nozzle end of said cylinder and said hollow interior of said cylinder.

18. The sport ball of claim 17 wherein said air transfer tube is concentrically disposed within the hollow interior of said cylinder.

19. The sport ball of claim 17 wherein said air transfer tube extends parallel with a longitudinal axis of said cylinder.

20. The sport ball of claim 17 wherein said air transfer tube includes a one-way valve disposed within the interior of said air transfer tube, said valve configured to only allow air flow in a direction towards said interior end wall of said cylinder.

21. The sport ball of claim 17 wherein said pump assembly further comprises:

a seal disposed within an annular region of said hollow interior of said cylinder extending between said air transfer tube and said interior circumferential surface defined by said sidewall of said cylinder, said seal configured to only allow air flow in a direction towards said interior end wall of said cylinder.

22. The sport ball of claim 17 wherein said pump cylinder further defines a first intake passage extending within said cylindrical sidewall from a first head aperture defined at said head end of said cylinder, to a first sidewall aperture defined by said interior circumferential surface, said first sidewall aperture defined proximate said interior end wall.

23. The sport ball of claim 22 wherein said pump cylinder further includes a one-way valve in communication with said first sidewall aperture, said valve configured to allow air flow in only a direction into said hollow interior of said cylinder.

24. The sport ball of claim 23 wherein said pump cylinder further defines a second intake passage extending within said cylindrical sidewall from a second head aperture defined at said head end of said cylinder, to a second sidewall aperture defined by said interior circumferential surface, said second sidewall aperture defined proximate said head end of said cylinder.

25. The sport ball of claim 24 wherein said pump cylinder further includes a second one-way valve in communication with said second sidewall aperture, said second valve configured to allow air flow in only a direction into said hollow interior of said cylinder.

26. The sport ball of claim 16 wherein said hollow interior of said pump plunger is defined by an interior end wall proximate said cap end of said plunger and a circumferential interior surface defined by said tubular wall of said plunger, said tubular wall defining a plunger inlet providing communication between said generally hollow interior of said plunger and the exterior of said plunger, said plunger inlet defined between said sealing end and said interior end wall of said plunger.

27. The sport ball of claim 16 further comprising:
a secondary inflation valve.

28. The inflatable sport ball of claim 16, said ball further comprising a second integral dual action pump assembly.

29. A dual action pump adapted for incorporation in an inflatable sport ball, said pump comprising:

a cylinder having a head end, a nozzle end, and a cylindrical sidewall extending therebetween, said sidewall having an exterior surface and an oppositely directed interior surface, said cylinder defining a generally hollow interior chamber accessible from said head end and said nozzle end;

a movable plunger disposed in said hollow interior chamber of said cylinder, said plunger having a cap end, a sealing end, and a tubular wall extending therebetween, said plunger defining a hollow interior region accessible from said sealing end;

an air transfer tube extending within both said hollow interior chamber of said cylinder and said hollow interior region of said plunger, said air transfer tube secured to said nozzle end of said cylinder;

wherein said sealing end of said plunger contacts and provides a seal with said air transfer tube and said interior surface of said sidewall of said cylinder.

30. The dual action pump of claim 29 further comprising a one-way valve disposed in said air transfer tube which only allows air flow to said nozzle end of said cylinder.